REMARKS/ARGUMENTS

Applicants thank the Examiner for the thorough examination of the claims as evidenced in the Office Action dated March 18, 2005. Applicants respectfully request reconsideration of the rejections to the claims contained therein.

Claims 1-11 and 13-20 remain in this application. Claim 3, 7-10, 13 and 15-16 have been amended. Claim 12 has been canceled by this Response. No new matter has been entered by the amendments hereto.

The Examiner rejected claims 1-3, 5, and 9-12 under U.S.C. § 102(b) as being unpatentable over U.S. Patent No. 4,944,025 to Gehring et al. The Examiner also rejected claims 4, 6-8, and 13-20 under 35 U.S.C. § 103(a) as being unpatentable over Gehring. Claim 12 has been canceled herewith, thereby rendering moot the rejection thereto. With respect to the remaining claims, applicants respectfully traverse these rejections.

Gehring discloses a direct conversion FM receiver using an AC coupler (coupling capacitors 24a, 24b) and automatic gain control (15 and 14) that provides a frequency offset to a downconverted frequency spectrum. A local oscillator (LO) 20 provides a down conversion frequency f_{down} to down conversion mixers 18a, 18b. The LO 20 further provides the frequency offset f_{offset}, which is selected based upon the baseband width of the modulated radio signals, as well as the spectral width of the DC notch created by the AC coupler (col. 4 lines 53-67) The LO of Gehring is described as comprising a voltage controlled oscillator (col. 4 lines 12-15).

In contrast, applicant claims in independent claim 1 a direct conversion quadrature receiver including a dithering controller responsive to the quadrature intermediate frequency signal generated by a primary LO, the dithering controller configured to communicate a feedback signal back to the primary LO, the feedback signal controlling an oscillation frequency of the primary LO. Gehring does not disclose a LO subject to dithering, which is defined in paragraph [0040] of applicants' specification as repeated stepping of frequency at predetermined intervals. Furthermore, nothing in Gehring teaches or even suggests a dithering controller providing a feedback to control the oscillation frequency of the primary LO. The gain

control feedback described at col. 5 lines 18-27 of Gehring is not disclosed as being related to oscillation frequency control as claimed by applicants.

The Examiner attempts to equate the voltage controlled oscillator described at col. 4 lines 12-15 with the claimed dithering controller. In fact, Gehring states the LO 20 *comprises* a voltage controlled oscillator, and the voltage controlled oscillator is not a separate disclosed element in Gehring. It is difficult to conceive how the voltage controlled oscillator, which comprises LO 20, provides a feedback signal to *itself* (LO 20) to control its own oscillation frequency. Because Gehring does not disclose or suggest a dithering controller that communicates a feedback signal back to the primary LO, where the feedback signal controls an oscillation frequency of the primary LO, claim 1 is allowable.

Claims 2-8 depend from allowable claim 1 and are therefore allowable for at least the same reasons claim 1 is allowable. With respect to claim 2, the Examiner asserts the limitations of claim 2 "basically reads on AGC controlled RF amplifier 14 in combination with the AGC detector 15...." However, Gehring specifically states that the "output of element 42 (a summing amplifier) is measured by the AGC detector 15 to control the gain of amplifier 14" (col. 5 lines 25-27). As shown by Gehring, the output of element 42 is an upconverted, reconstructed signal, and not a quadrature IF signal as claimed in applicants' claim 2. Also, the output of element 42 contains no phase error element, as required by applicants' claim 2. Furthermore, Gehring clearly states that the AGC detector 15 controls the gain of *amplifier* 14, instead of an offset of the primary LO as recited in applicants' claim 2. Claim 2 is therefore allowable.

Amended claim 3 recites that the dithering controller controls the primary LO to step the quadrature IF signal in response to the phase and gain error signal. The Examiner states that the dithering controller is the voltage controlled oscillator, and that said voltage controlled oscillator controls the primary LO 20 to step the quadrature IF signal in response to the phase and gain error signal. Firstly, the voltage controlled oscillator *is* the primary LO 20 (col. 4 lines 12-15), and Gehring does not disclose how the primary LO 20 controls itself in response to a phase and gain error signal. Furthermore, Gehring does not disclose an error signal that includes a phase element. Claim 3 is therefore allowable.

With respect to claim 4, The Examiner states that although Gehring does not exactly teach a memory storing a predetermined step size and a predetermined step limit,

> ...having a memory or a table within the memory that stores predefined numbers as a threshold, which drives away the signal every time it reaches that threshold is well known in the art. Obviously, having a table with threshold values will help to make any system function smoothly and without any errors.

While the existence of threshold tables in a memory is clearly well known, the Examiner has not shown, demonstrated, or provided a rationale that such threshold tables could be combined with the direct conversion receiver of Gehring. Indeed, the disclosure of Gehring teaches away from such a memory by deriving a single offset frequency (100 kHz). When using a single offset frequency there is no need to store a predetermined step size as well as a predetermined step limit, because the employment of both a predetermined step size and step limit presumes multiple offset steps. Because the single offset frequency of Gehring teaches away from a memory storing a predetermined step size and a predetermined step limit, claim 4 is allowable.

The Examiner rejected claim 5 for the same reasons as claim 1, and further asserting that the "hop sequence may read on 100 kHz." Applicants are confused by this comment. Claim 5 recites that "said dithering controller controls said primary LO to dither said quadrature IF signal according to a predetermined hop sequence." The single 100 kHz offset frequency disclosed in Gehring is not a dithering of a quadrature IF signal according to a predetermined hop sequence. No sequence of hops is disclosed by Gehring, and claim 5 is allowable.

The Examiner rejected claim 6 under the same rationale as claim 4. Claim 6, however, recites "a memory storing a predetermined hop sequence that dithers said primary LO over a plurality of hop frequencies." Gehring does not disclose a predetermined hop sequence that dithers the primary LO over a plurality of hop frequencies. The single offset frequency of 100 kHz does not anticipate or suggest a plurality of hop frequencies. There is simply no suggestion in Gehring of the concept of dithering as described and claimed by applicants. Claim 6 is therefore allowable.

With respect to amended claim 7, the Examiner incorrectly relies upon the AGC detector 15 of Gehring to anticipate the claimed interferer level detector. As recited in

claim 7, the interferer level detector measures each frequency spectra of said plurality of frequency spectra which were generated from a quadrature IF signal. However, the AGC detector of Gehring measures the combined output of the direct conversion receiver, and does not measure each frequency spectra. Furthermore, claim 7 has been amended such that its recitations are part of the dithering controller. The voltage controlled oscillator of Gehring (which in reality is the LO 20) is not disclosed to have sufficient scope to include filters 32a and 32b, AGC detector 15, and FM discriminator 44. Claim 7 is therefore allowable.

Claim 8 was rejected on the same grounds as claim 7, and is allowable for at least the same reasons as claim 7. In addition, amended claim 8 recites that the dithering controller comprises a phase and gain error limit threshold that compares a current phase and gain error to a previous phase and gain error, generates a phase and gain error difference, and generates a step-required output to said LO if said phase and gain error difference exceeds a predetermined phase and gain error limit threshold. While it is known to compare a derived number to a threshold, the Examiner has not demonstrated that the threshold as claimed in applicants' claim 8 is properly combined with the disclosure of Gehring. For example, applicants' claimed threshold generates a step-required output to the LO if the phase and gain error difference exceeds a predetermined phase and gain error limit threshold. No such step-required output based upon a phase and gain error difference is disclosed or suggested in Gehring, and claim 8 is therefore allowable.

Claim 9 has been amended to recite the subject matter of claim 12, and specifically recites that the offsetting comprises dithering said primary LO over a plurality of hop frequencies in a predetermined hop sequence. As previously explained, the single 100 kHz offset frequency disclosed in Gehring is not a dithering over a plurality of hop frequencies in a predetermined hop sequence. Claim 9 is therefore allowable. Claims 10-11 and 13-20 depend directly or indirectly from allowable claim 9 and are therefore allowable for at least the same reasons claim 9 is allowable.

Amended claim 10 was rejected with claim 2 and recites subject matter similar thereto. As previously stated with respect to claim 2, the output of element 42 of Gehring is an upconverted, reconstructed signal, and not a quadrature IF signal as claimed in applicants' claim 10. Also, the output of element 42 contains no phase error

element, as required by applicants' claim 10. Furthermore, Gehring clearly states that the AGC detector 15 controls the gain of amplifier 14, instead of an offset of the primary LO as recited in applicants' claim 10. Claim 10 is therefore allowable.

The Examiner rejected claims 13-16 using the following reasoning:

> Claims 13-16 basically read on the process of finding the outlier phase and gain error and removing the outlier phase and gain error. Gehring teaches setting up the signal frequency to a desired signal frequency in order to prevent any loss (see col. 4, lines 52-67). Obviously, when a signal is found in a phase and gain error state, logically it has to be either removed or corrected.

The Examiner misunderstands applicants' invention, which goes beyond the simple frequency offset disclosed by Gehring and referenced by the Examiner at col. 4 lines 52-67 of Gehring. Applicant is not merely finding a signal in a phase and gain error state, as asserted by the Examiner. The recitations of a plurality of hop frequencies, a corresponding plurality of phase and gain errors, averaging the plurality of phase and gain errors, finding an outlier phase and gain error, and removing the outlier phase and gain error from the phase and gain error average are recited in applicants' claim 13 and go well beyond discovering a phase and gain error. Gehring fails to disclose or suggest any of these limitations, and the Examiner has failed to show how these limitations are obvious in light of the cited art. Claim 13 is allowable.

The recitation in claim 14 of removing from said hop sequence a hop frequency that generated said outlier phase and gain error also is not taught or suggested by Gehring. Gehring fails to disclose or suggest anything about a hop sequence, or removing from a hop sequence a hop frequency that generated an outlier phase and gain error. Claim 14 is therefore allowable.

The recitation in claim 15 that said measuring, averaging, finding, and removing steps are iteratively performed is not taught or suggested by Gehring. Gehring fails to disclose or suggest iterative measuring, averaging, finding, and removing steps as claimed by claim 15, and claim 15 is therefore allowable.

The recitations in claim 16 of finding a distance of each phase and gain error from said phase and gain error average, and determining said outlier phase and gain error to be a phase and gain error that is a greatest distance from said phase and gain error average is also not taught or suggested by Gehring. There is no discussion or

suggestion in the cited art of averaging a plurality of phase and gain error values and finding a distance of each phase and gain error from said average. Claim 16 is therefore allowable.

The Examiner rejected claims 17-20 for the same reasons as claim 7. To the extent claims 17-20 recite subject matter similar to what is recited in claim 7, claims 17-20 are allowable for at least the same reasons claim 7 is allowable. However, claims 17-20 depend from allowable claims 9 and/or 13 and are therefore allowable for the same reasons claims 9 and 13 are allowable. Furthermore, claim 17 recites that the finding step (of claim 13) comprises comparing each phase and gain error of said plurality of phase and gain errors to a predetermined outlier threshold, and determining said outlier phase and gain error to be a phase and gain error that *most* exceeds said predetermined outlier threshold. Such limitations are not taught or suggested by the cited art, and claim 17 is allowable. Claim 18 recites that the finding step (of claim 13) comprises comparing each phase and gain error of said plurality of phase and gain errors to a predetermined outlier threshold, and determining said outlier phase and gain error to be any phase and gain error that exceeds said predetermined outlier threshold, wherein the determining step is capable of determining more than one outlier. Such limitations are not taught or suggested by the cited art, and claim 18 is allowable. Claim 19 recites limitations of creating a plurality of quadrature IF frequency spectra, and comparing a frequency spectra of said plurality of quadrature IF frequency spectra to a predetermined power threshold, wherein the offsetting step is performed if said frequency spectra exceeds said predetermined power threshold. Gehring neither teaches nor suggests such limitations, and specifically fails to teach or suggest performing an offsetting step if a frequency spectra exceeds a predetermined power threshold. Claim 19 is allowable. Claim 20 recites the limitations of measuring a phase and gain error in said quadrature IF signal, creating a difference value of a difference between said phase and gain error and a previous phase and gain error, and comparing said difference value to a predetermined phase and gain error limit threshold, wherein the offsetting step is performed if said difference value exceeds said predetermined phase and gain error limit threshold. Gehring neither teaches nor discloses these limitations, and specifically says nothing about comparing a phase and gain error to a previous phase and gain error. Claim 20 is therefore allowable.

Accordingly, with entry of the amendments and consideration of the arguments and remarks contained herein, all pending claims are now allowable, and a notice of Allowance is earnestly solicited. The Examiner is invited to contact the undersigned attorney if further issues remain in the prosecution of this application.

Respectfully Submitted,

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